FEM-2

Instruction Manual

As of: 05/2003

All artwork, pictures and texts are covered by our copyright.

They must not be copied (e.g. on CD-ROM, disks or internet-sites) or used in their entire form or in excerpts without our previous written agreement.

If you are downloading PDF-files from our internet homepage for your personal use, make sure to check for updated versions.

We cannot take any liability whatsoever for downloaded files, as technical data are subject to change without notice.

Contents

1. Contents

1. Contents 3

2. Safety Instructions and Legal Disclaimer ..5
2.1. Safety Instructions 5
Warning Signs 5
General Safety Instructions 5
Product Specifications 6
Explanation of the Symbols in the Manual 6
2.2 Disclaimer 7

3. General Description 9
Compatibility 9
Cameras 10
Lens Control 10
Camera Remote Control 10
Motion Control 10
Time Code 10
The following devices can be used with certain limitations 10
Use of the following equipment is not permitted 11

4. Setup 13
Preparation 13
4.1 Installing the FEM-2 on the camera 15
4.2 Installing the URM-1 radio receiver 17

5. Operating 19
5.1 Lens Data Display 19
5.2 Radio system 21
To change the radio channel: 22
5.3 Remote Lens Control 23
Lens Motors 23
ZMU-1, FIU-1 and CLM-1 Motors 25
ZMU-1, FIU-1 and CLM-2 Motors 26
WFU-1, WZU-1 and WHA-2 mit CLM-1 27
WFU-1, WZU-1 and WHA-2 mit CLM-2 28
Mixed Operation 29
Wireless Control of Focus and Iris,Zoom via ZMU-1 30
Zoom, Focus and Iris Wireless 31
Zoom, Focus and Iris Wireless via Two Separate Handheld Controls 32

Contents

5.4 Camera remote control 33
WRC-1 via wireless remote control 34
WRC-1 with WHA-2 via cable 35
WRC-1 with WHA-1 36
RCU-1 37
CCU-1 38
5.5 Time code 39
Operation 39
Changing the batteries 39

6. Technical Data 40

7. Additional Documentations 41

2. Safety Instructions and Legal Disclaimer

2.1. Safety Instructions

Please always follow these instructions to help ensure against injury to yourself and damage to the system or other objects.
This safety information is additional to the product-specific operating instructions in general and must be strictly observed for safety reasons. They are no substitute to settled down you own safety measures.

Warning Signs

Possible risk of injury or damage to equipment.

This symbol indicates the risk of electric shock or fire danger that could result in injury or equipment damage.

General Safety Instructions

Read and understand all safety and operating instructions before you operate or install the system.

Retain all safety and operating instructions for future reference.

Heed all warnings on the system and in the safety and operating instructions before you operate or install the system.
Follow all installation and operating instructions.

Do not use accessories or attachments not recommended by ARRI, as they may cause hazards and void the warranty.

Do not repair any part of the system. Repairs must only be carried out by authorized ARRI repair shops.

Do not remove any safety measure of the system.

Do not operate the system in high humidity areas or expose it to water or moisture.

Do not place the system on an unstable cart, stand, tripod, bracket, or table. The system may fall, causing serious personal injury and damage to the system or other objects.

Operate the system using only the type of power source indicated in the manual. Unplug the power cord by gripping the power plug, not the cord.

Never insert objects of any kind into the any part of the system through openings, as the objects may touch dangerous voltage points or short out parts. This could cause fire or electrical shock.

Unplug the system from the power outlet before opening any part of the system or before making any changes on the systems, especially the attaching or removing of cables.

Do not touch optical surfaces!

Do not use force!

Clean optical surfaces only with a lens brush or a clean lens cloth! In cases of solid dirt moisten a lens cloth with pure alcohol.

Do not use solvents in cleaning!

Do not remove any screws which are secured with paint!

Any violation of this safety instructions or the non-observance of personal care could cause serious injuries (including death) and damages on the system or other objects.

Product Specifications

In the case of inquiries or when ordering parts, please advise serial number and model.

Explanation of the Symbols in the Manual

Note: Indicates important remarks and cross references.

⇨ **photo** indicates objects which are shown in the photographs or drawings.

2.2 Disclaimer

No part of this document may be copied or reproduced in any form or by any means without prior written consent of ARRI. ARRI assumes no responsibility for any errors that may appear in this document. The information is subject to change without notice. For actual design-in, refer to the latest publications of ARRI data sheets or data books, etc., for the most up-to-date specifications. Not all products and/or types are available in every country. Please check with an ARRI sales representative for availability and additional information.

While ARRI endeavors to enhance the quality, reliability and safety of their products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in the products, customers must incorporate sufficient safety measures in their work with the system and have to heed the statuted canonic use.

The ARRI FEM-2 is only available for commercial customers. The customer grants by utilization, that the ARRI FEM-2 or other components of the system are only deployed for commercial use. Otherwise the customer has the obligation to contact ARRI preceding the utilization.

ARRI or its subsidiaries does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of ARRI products or any other liability arising from the use of such products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of ARRI or others.

ARRI or its subsidiaries expressly excludes any liability, warranty, demand or other obligation for any claim, representation, or cause, or action, or whatsoever, express or implied, whether in contract or tort, including negligence, or incorporated in terms and conditions, whether by statue, law or otherwise. In no event shall ARRI or its subsidiaries be liable for or you have a remedy for recovery of any special, direct, indirect, incidental, or consequential damages, including but not limited to lost profits, lost savings, lost revenues or economic loss of any kind or for any claim by third party, downtime, good-will, damage to or replacement of equipment or property, any costs or recovering

of any material or goods associated with the assembly or use of our products, or any other damages or injury of persons and so on or under any other legal theory.

In the case one or all of the forgoing clauses are not allowed by applicable law, the fullest extent permissible clauses by applicable law are validated.

ARRI is a registered trademark of Arnold & Richter Cine Technik GmbH & Co Betriebs KG.

3. General Description

The FEM-2 is an expansion module for the ARRIFLEX 435 Advanced camera that provides the following functions:

- LDD (Lens Data Display) interface
- CCU interface (RS232)
- ACC interface
- Time code exposure
  according to SMPTE RP136 (Barcode)
- Controls up to three CLM-2 motors
- Two LCS bus interfaces for CLM-1, WHA-2 and ZMU-1
- URM-1 (Universal Radio Module) compatible

Compatibility

To use the FEM-2 with the ARRIFLEX 435 Advanced the following Versions of Software are necessary:
435 Advanced: SW 2.73 or higher
Firmware 2.65 or higher
WRC-1: V 1.08 or higher
LDD: 2.59 or higher.

The FEM-2 must only be used on the ARRIFLEX 435 Advanced. The attempt to force the module onto the ARRIFLEX 435 or 435 ES results in damage to the equipment!

Use only accessories that are compatible with the FEM-2! Accessories not included in the compatibility list below must not be used on the FEM-2!

Incompatible accessories or accessories not approved by ARRI could damage the FEM-2, the camera or the accessory itself.

The FEM-2 is compatible with the following cameras and accessories:

Cameras

ARRIFLEX 435 Advanced K0.59981.0
ARRIFLEX 435 Advanced Anamorphic K0.59982.0
ARRIFLEX 435 Advanced 3perf..... K0.59983.0

Lens Control

URM-1 ..... K2.52048.0
WHA-2..... K2.54079.0
ZMU-2..... K2.52093.0
CLM-1 ..... K2.41378.0
CLM-2 ..... K2.52036.0
LDD K2.54012.0
LDD-FP K2.54163.0

Camera Remote Control

WRC-1 (on WHA-2 or WMU-1)..... K2.52087.0
ESU-1 ..... K2.46006.0

Motion Control

ARRIMOTION LCB-1 ..... K2.52104.0

Time Code

SMPTE Time Code Module K2.47294.0

The following devices can be used with certain limitations

RCU-1.....K2.47197.0
No fast ramping speeds, 0.1 fps not possible
WHA-1.....K2.52070.0
No fast ramping speeds, 0.1 fps not possible
ICU-1 .....K2.47028.0
Might lead to exposure fluctuations
See nomogram in the ICU-1 instruction manual
CCU..... camera speeds below 1 fps can not be programmed

Use of the following equipment is not permitted

Use of the following equipment is not permitted!

UC-C2 Run Cable K2.52076.0
LC-S1 Power Cable K4.46859.0
LC-S2 Power Cable K2.47146.0
LC-S3 Power Cable K2.47147.0
LC-A1 Battery Adapter Cable K2.41385.0
LC-A2 Battery Adapter Cable K2.41386.0
LC-A3 Battery Adapter Cable K2.44022.0
LC-C1 Run Cable K2.41398.0
LC-C2 Run Cable K2.41399.0
FEM-1.....K4.52136.0
Replaced by FEM-2

ARRIMAG 120
LCS
LCS
ACC
CCU
LDS
RDY
ZOOM
FOCUS
IRIS
RF CHAN
ARRI
FEM-2
ARRI
URM-1
ARRI
PRIME
85

4. Setup

Switch off the camera and disconnect all cables from the camera and the FEM-2 before installing the FEM-2 on the camera.

Switch off the camera and disconnect all cables from the camera and the FEM-2 before installing the URM-1 on the camera.

The installation of the FEM-2 and the URM-1 has to be carried out on a static free workstation.

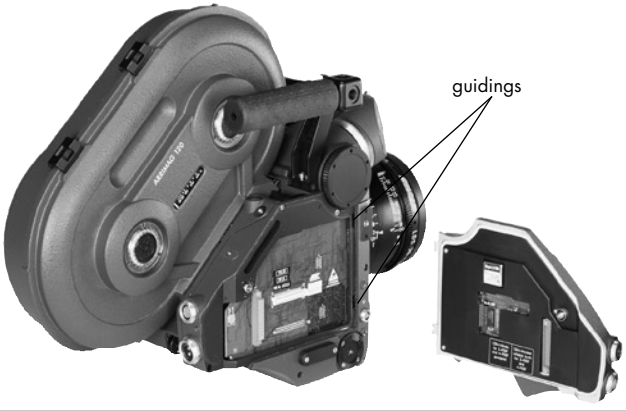
Preparation

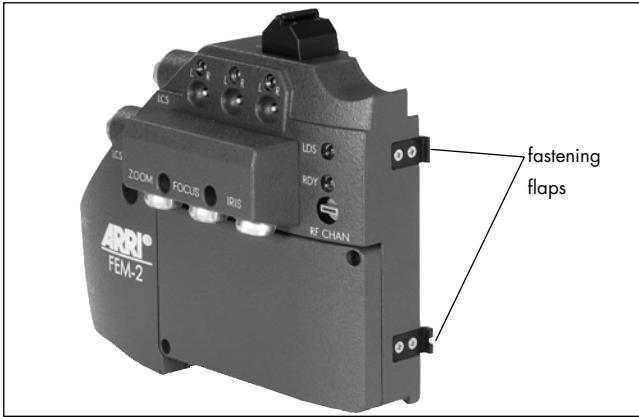
- Verify the software version of the camera before installation:

Software version 3.xx or higher is required to operate the FEM-2 with the ARRIFLEX 435 Advanced.

- A 3mm Allen key is required to install the FEM-2 on the camera.
- A 2.5mm Allen key is required to install the URM-1 on the FEM-2.

ARRI
fastening screw


guidings


ZOOM
FOCUS
IRIS
RDY
RF CHAN
ARRI
FEM-2
fastening
flaps

4.1 Installing the FEM-2 on the camera

Install the FEM-2 on the right side of the camera.

Installation must be carried out at an ESD-secured workstation.

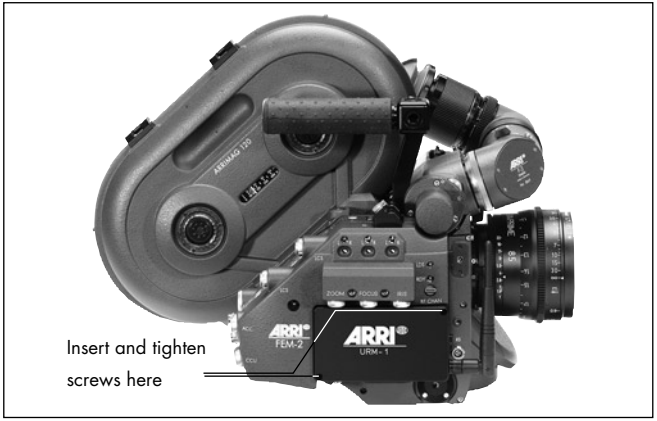
To install the device:

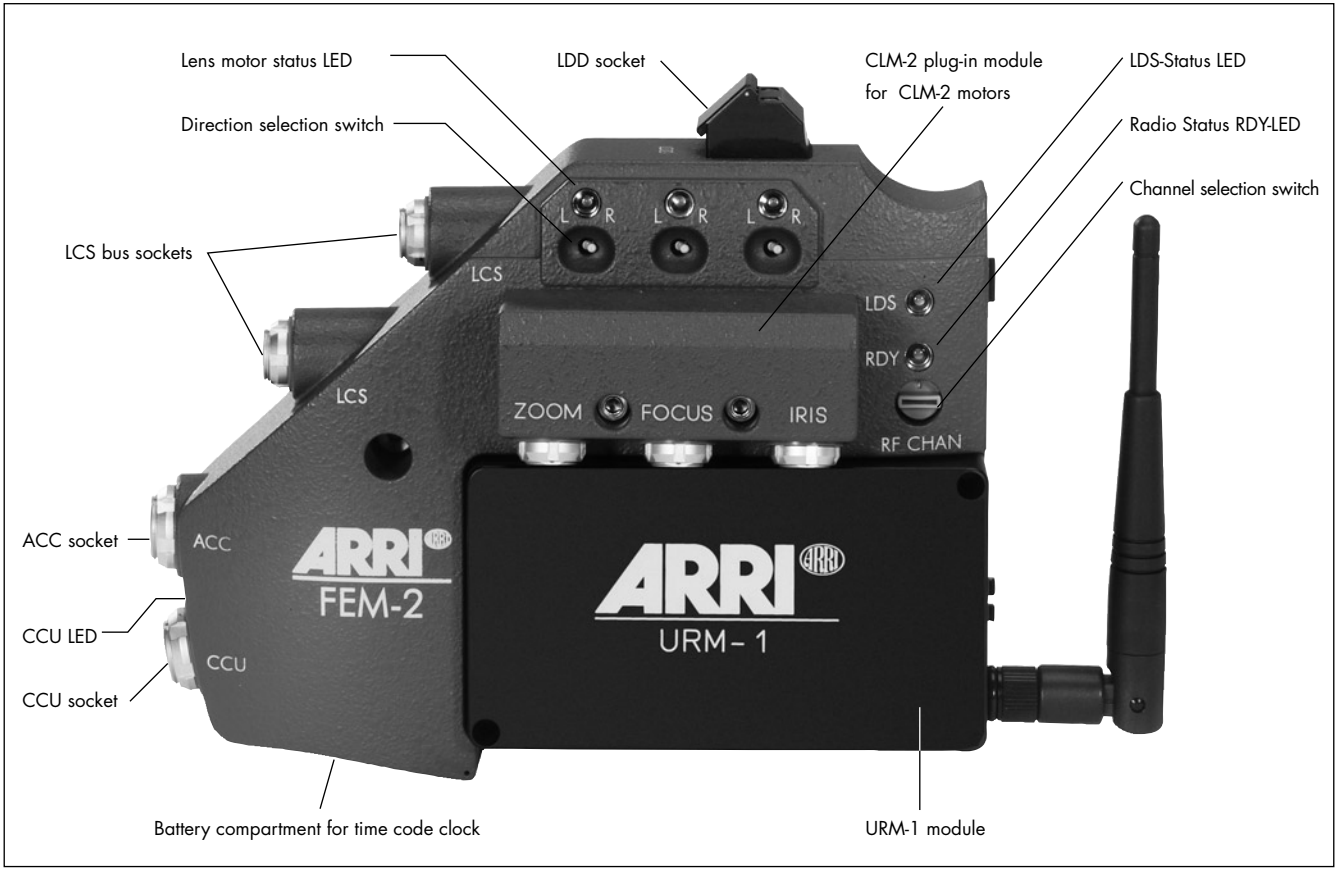
- The camera should be fixed ideally on a pivoting head to secure working.
- Turn the camera off and disconnect all cables.
- Remove the screw on the FEM-1 that is installed on the right side of the camera ⇨ **photo**.
- Pull the FEM-1 backwards to remove it from the camera.
- Take the FEM-2 out of its packaging.
- Insert the two tabs at the front of the FEM-2 into the guiding on the camera (or IVS) ⇨ **photo**.
- Press the FEM-2 into the connectors on the camera.
- Secure the FEM-2 using the screw supplied (tightening torque< 0.5Nm)

L R
L R
L R
LCS
LDS
RDY
LCS
ZOOM
FOCUS
IRIS
RF CHAN
cover
ACC
ARRI
FEM-2
CCU
two screws
M3x8 A2 DIN 912

4.2 Installing the URM-1 radio receiver

- Untighten the two screws ⇨ **photo** and remove the cover.
- Remove the two screws (DIN 912 M3*8) from the holes in the cover.
- Apply the URM-1 to the FEM-2.
- Secure the URM-1 to the FEM-2 using the two screws taken from the cover (tightening torque<0.3Nm).




Lens motor status LED
LDD socket
CLM-2 plug-in module
for CLM-2 motors
LDS-Status LED
Direction selection switch
Radio Status RDY-LED
Channel selection switch
LCS bus sockets
L R
L R
L R
LCS
LCS
LDS
RDY
ZOOM
FOCUS
IRIS
RF CHAN
ACC socket
ACC
ARRI
FEM-2
ARRI
URM-1
CCU LED
CCU
CCU socket
Battery compartment for time code clock
URM-1 module

5. Operating

5.1 Lens Data Display

The LDS integrated into the FEM-2 is compatible with all lenses equipped with ARRI LDS contacts.

The LDS status LED ⇨ **photo** indicates the status of the LDS system as follows:

Color	Status
Green	LDS OK
Off	No LDS lens
Red	LDS transfer error

- The lens data display is connected to the LDD socket ⇨ **photo** on the top of the module. The following cables should be used:

  LDD K4.55855.0
  LDD cable 0.5m / 1.7 ft Spiral Cable

  LDD-FP K2.54172.0
  LDD-FP cable 0.6m /2ft Spiral Cable

Note: For details of how to use the lens data displays, see the operating instructions provided with the displays.

- The installation of the lens motors is described in chapter 5.3.

Note: For details of how to use and clean the lens mount, see the operating instructions for the ARRIFLEX 435 Advanced.

LDS status LED
Radio status RDY-LED
cannel selection
L R
L R
L R
LCS
LCS
LDS
RDY
ZOOM
FOCUS
IRIS
RF CHAN
ACC
CCU
ARRI
FEM-2
ARRI
URM-1
URM-1 module

5.2 Radio system

Select an RF channel indicated for use in your country before switching on the system. Do not use RF channels that are not permitted in your country.

Only use antennas supplied by ARRI. Do not use directional antennas, omni-directional antennas or boosters. The RF modem could be damaged and conformance to standards cannot be ensured.

A radio receiver URM-1 ⇨ **photo** can be mounted on the FEM-2. This permits the wireless communication of positioning information for lenses and the camera remote control.

Note: The installation of the URM-1 is described in chapter 4.2.

A channel selection switch ⇨ **photo** and a status LED ⇨ **photo** for the radio receiver are integrated on the FEM-2.

- The channel selection switch is used to adjust the correct radio channel for data transfer according to the following table.

Note: The applicable regional radio guidelines must be observed.

- You must set the same radio channel on the FEM-2 and the assigned handheld controls.

Channel	Use
0	Europe except France and Spain, to be used in the USA, Canada, Mexico, New Zealand
1	Europe except France and Spain, to be used in the USA, Canada, Mexico, New Zealand
2	Europe except Spain
3	USA, Canada, Mexico, New Zealand, France
4	Japan
5	Australia
6	Australia
7	Spain
8	Corresponds to switch setting 0
9	Radio device deactivated

To change the radio channel:

- With the camera off, set the channel and then turn the camera on.
- Set the channel selection switch to 9 (deactivated) and then turn it to the required channel within half a second.
- Set the channel selection switch on the activated camera to the new channel, the RF LED goes red. Then turn the camera off and back on after around 5 seconds.

The RDY LED of the radio system ⇨ **photo** indicates the status of the radio as follows:

Color	Status
Off	wireless remote control deactivated (channel 9 selected) or camera deactivated or camera has no power
alternating red/green	radio modem is being initialized. Do not activate WMU-1 yet.
Green blinking	wireless remote control is ready, activate the WMU-1.
Green	wireless remote control OK
Red	channel selection switch has been changed. Wireless remote control will continue to function but the channel will be changed the next time it is switched on. -> Reset to the previously selected channel if the change was unintentional, or turn module off and on again to change channel.
Red blinking	hardware error in radio module. If this error still occurs even after restarting the camera, replace the radio module or send the FEM-2 and radio module for service.
Red blinking rapidly	Radio fault: another URM, LDB or FEM-2 are on the same channel. Select another channel.

5.3 Remote Lens Control

Lens Motors

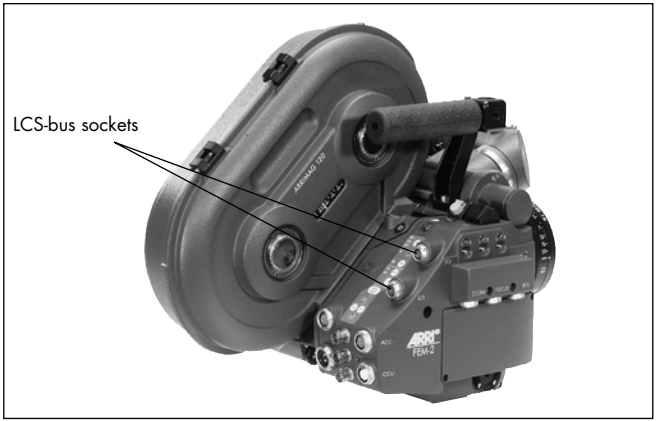
Both CLM-1 and CLM-2 motors can be used with the FEM-2.

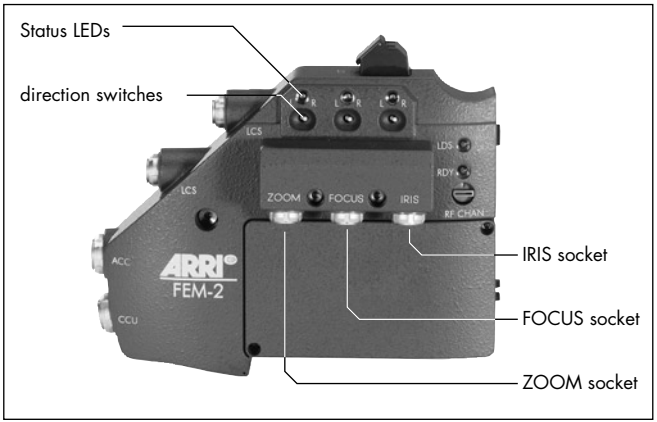
- The CLM-1 motors are connected to the LCS bus sockets ⇨ **photo**.
- The CLM-2 motors should be connected to the zoom, focus and iris sockets ⇨ **photo** on the CLM-2 plug-in module.

Note: CLM-1 motor function has priority over the CLM-2 motor.

If a CLM-1 motor is set to the function zoom, focus or iris and is connected to the FEM-2, the corresponding CLM-2 connection is deactivated.

Each CLM-2 motor connection has a direction switch ⇨ **photo** and a status LED ⇨ **photo**.





- Use the direction switch to change the rotational direction of the attached motor.

The status LED indicates the following:

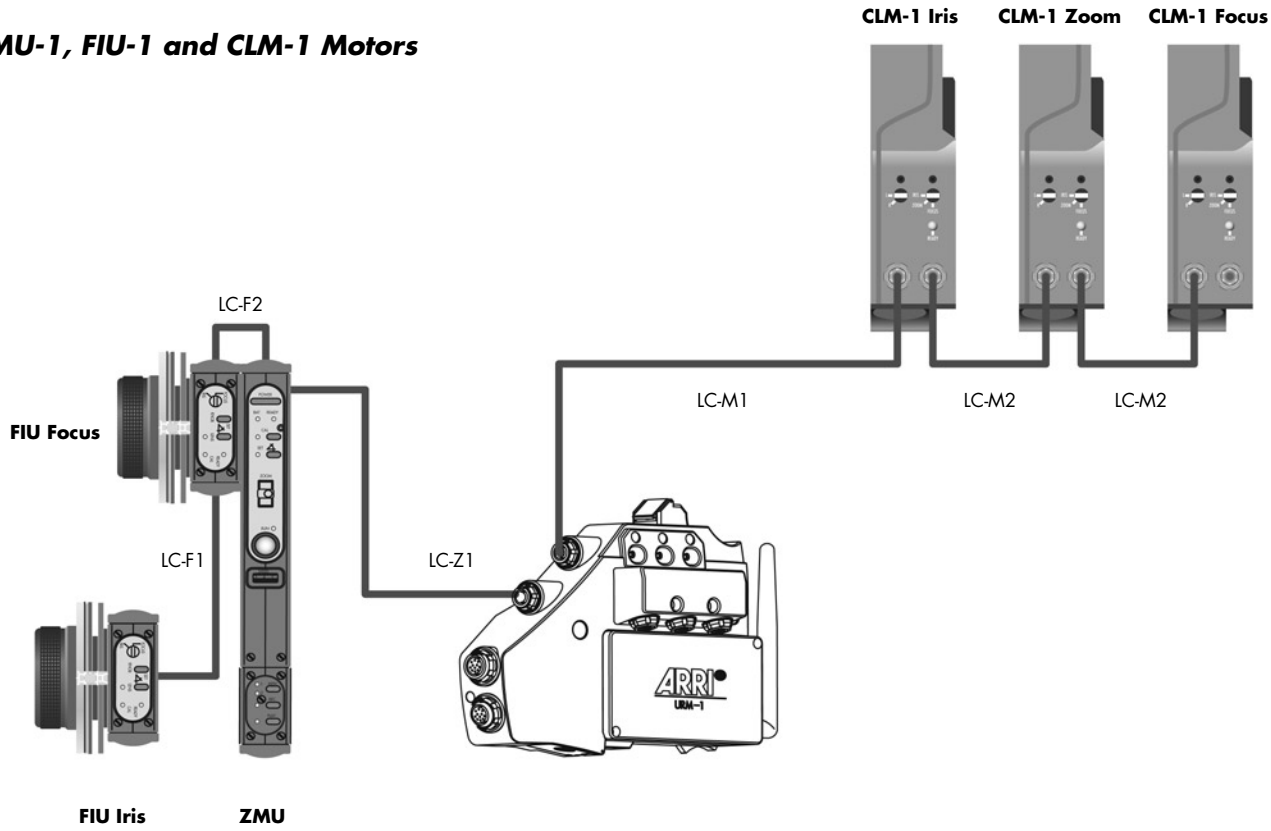
Color	Status
Off	no motor connected
Red	motor connected, but no handheld control found
Green	motor OK
Green blinking	motor OK, but in an end stop
Rot blinking	motor conflict: CLM-1 assigned to the same function
Red/green blinking	calibrating

The following pages show some of the possible setups with the LCS system. These are only samples and further variations are of course possible.

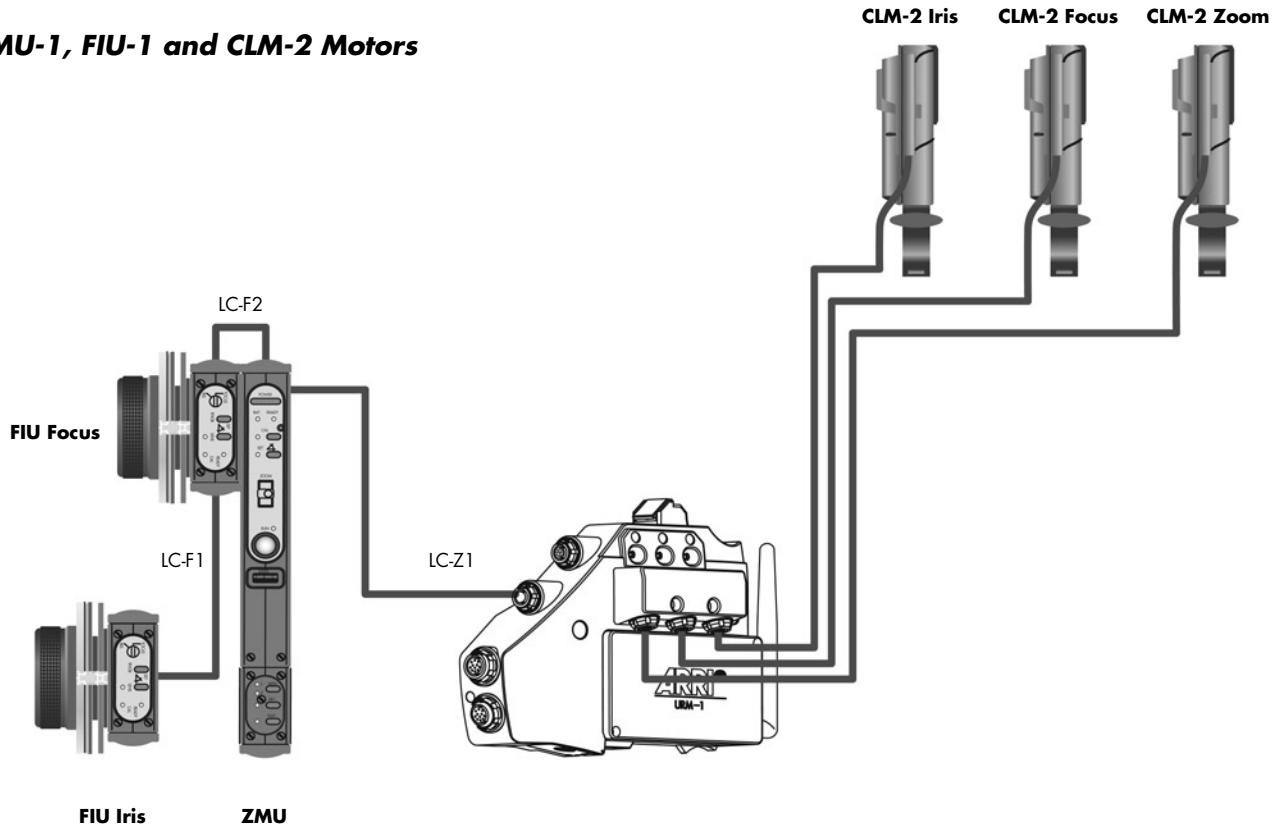
The LC-M1, LC-M2, LC-Z1 and LC-Z2 cables are interchangeable and differ only in their appearance and length.

Cable	Appearance
LC-M1	Spiral, 1m long outstretched
LC-M2	Straight, 0.15m long
LC-Z1	Straight, 3.5m long
LC-Z2	Straight, 7m long

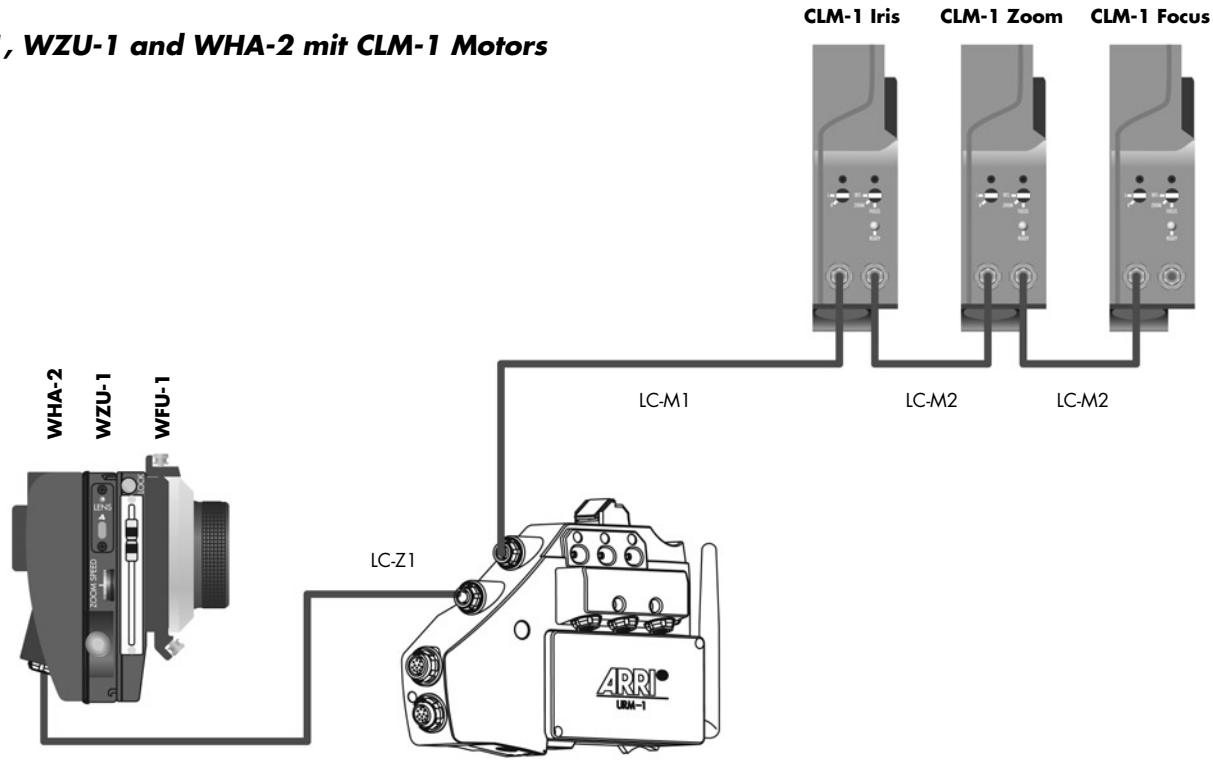
ZMU-1, FIU-1 and CLM-1 Motors



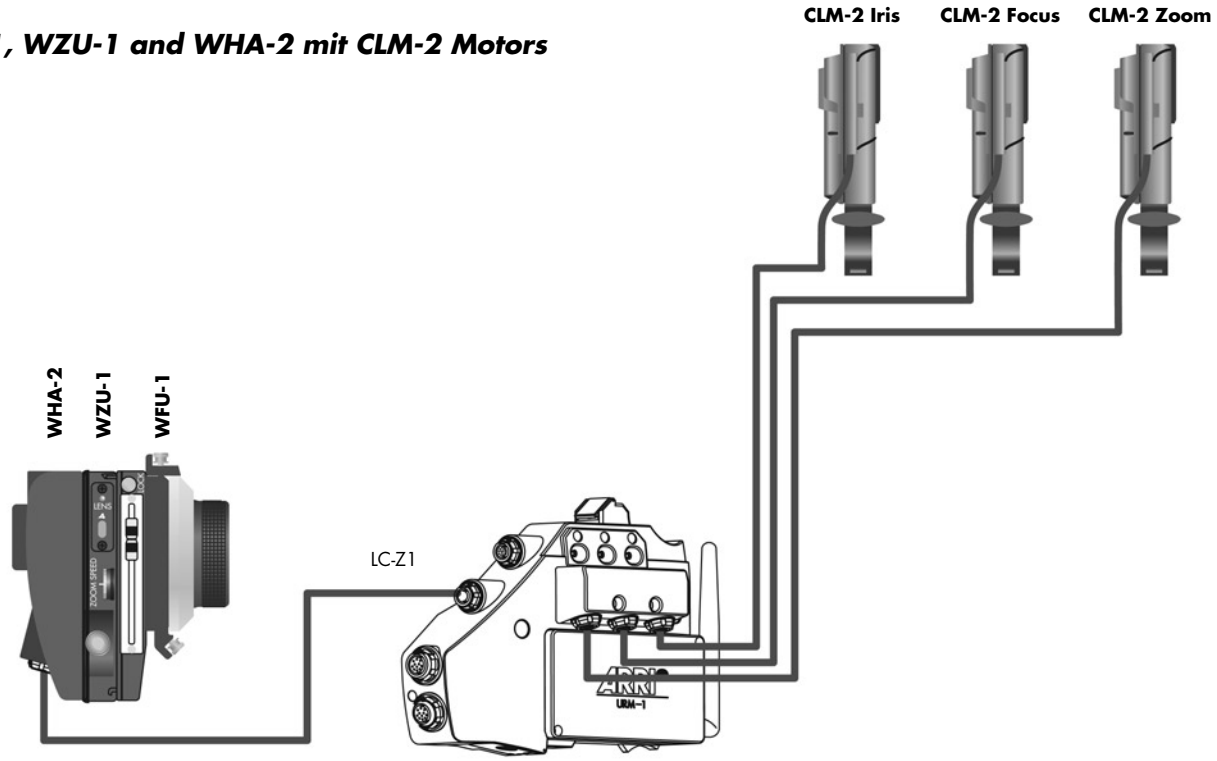
ZMU-1, FIU-1 and CLM-2 Motors



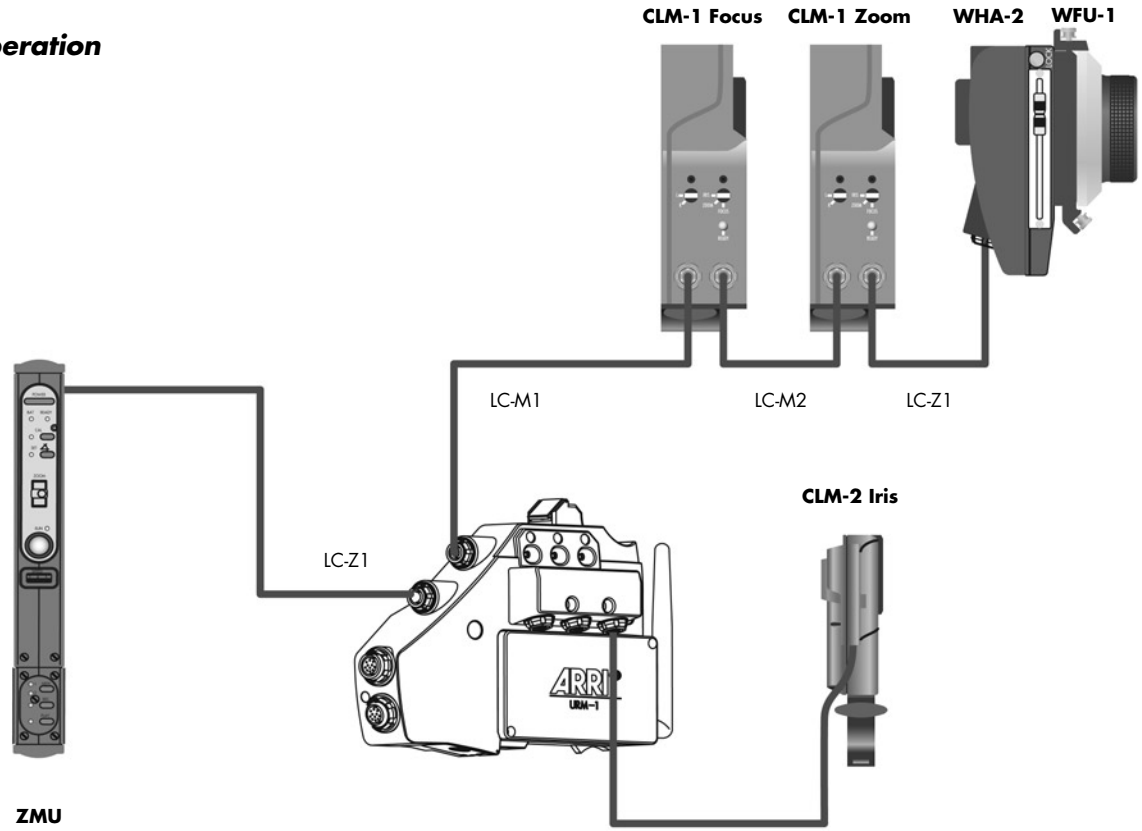
WFU-1, WZU-1 and WHA-2 mit CLM-1 Motors



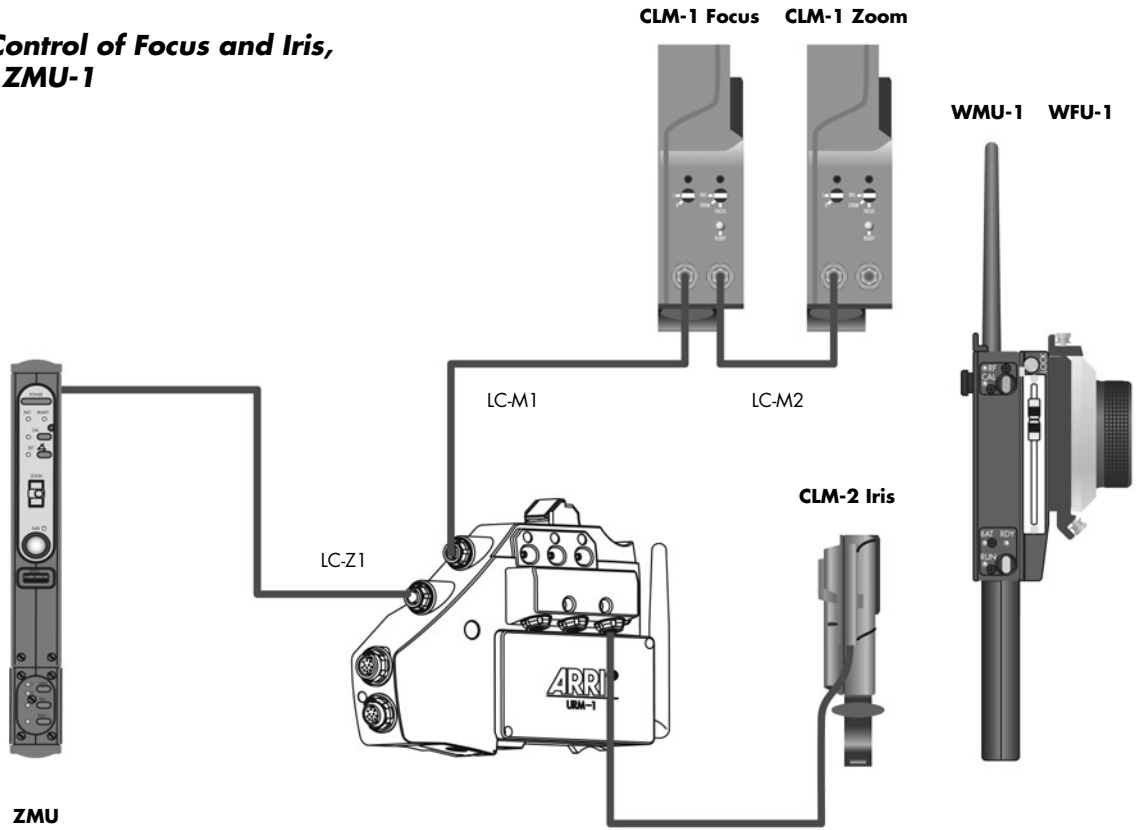
WFU-1, WZU-1 and WHA-2 mit CLM-2 Motors



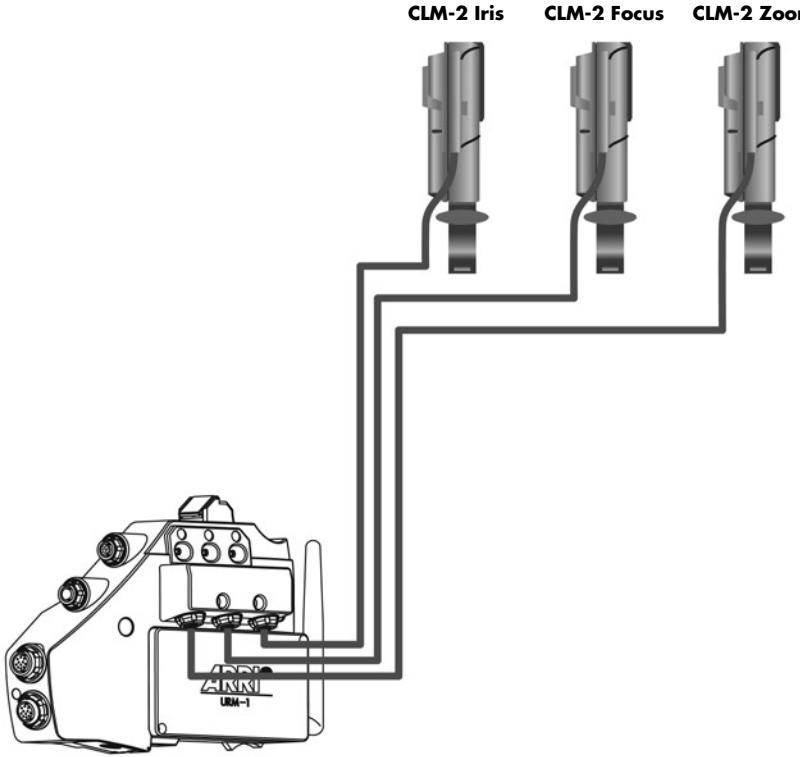
Mixed Operation



Wireless Control of Focus and Iris, Zoom via ZMU-1

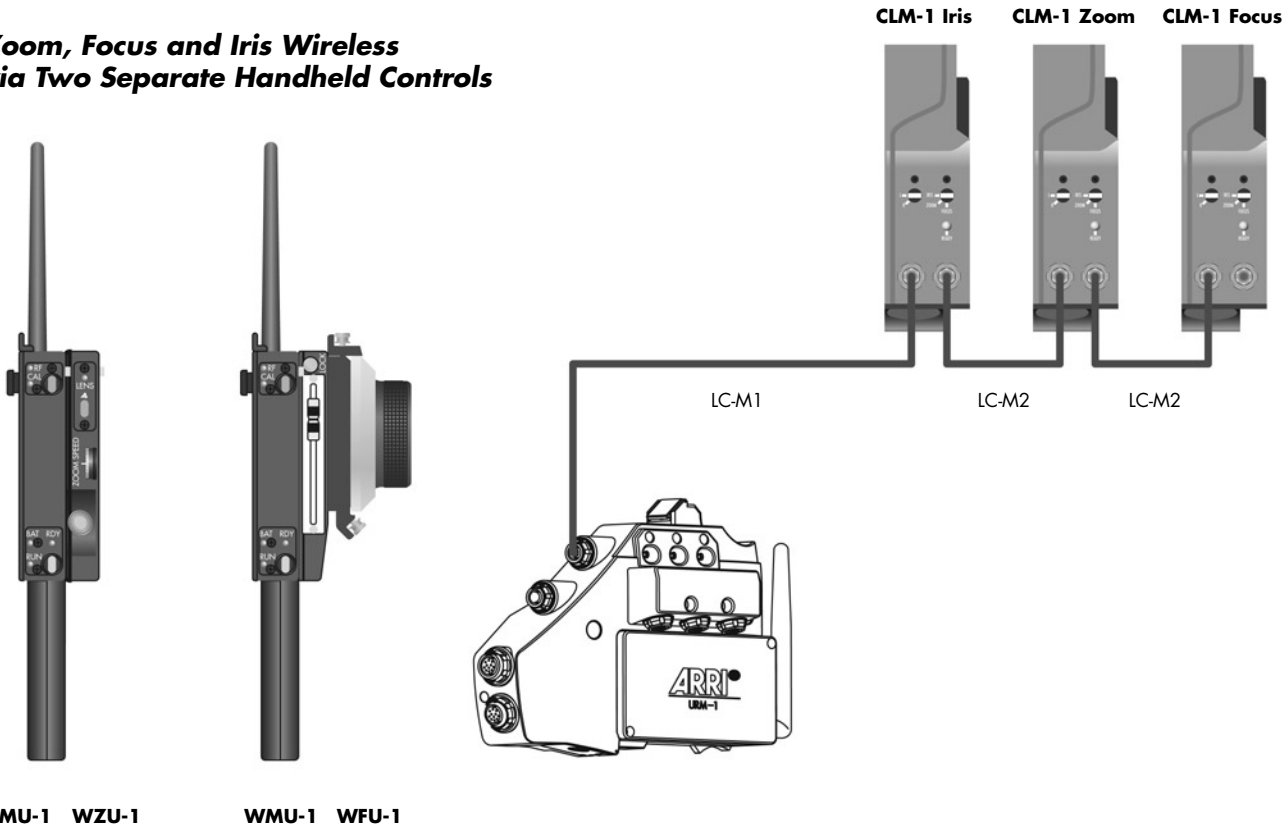


Zoom, Focus and Iris Wireless



WMU-1 **WZU-1** **WFU-1**

Zoom, Focus and Iris Wireless
via Two Separate Handheld Controls



5.4 Camera remote control

Note: For details of how to use the RCU-1 and WRC-1, please see the instruction manuals supplied with these units.
For details of how to use RCU-1 and ESU-1, please see the instruction manual for the ARRIFLEX 435 Advanced.

The FEM-2 enables the camera to be remote controlled by cable and via wireless remote control.

Only one control unit may be connected to the FEM-2 at any time.

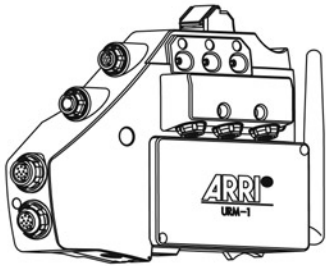
If the remote control is carried out wireless (WRC-1 with WMU-1) or LCS (WRC-1 with WHA-2), the CCU LED indicates that the CCU socket is not available.

Color	Status
Red	CCU socket not available
Green	CCU socket for CCU, RCU, LCC

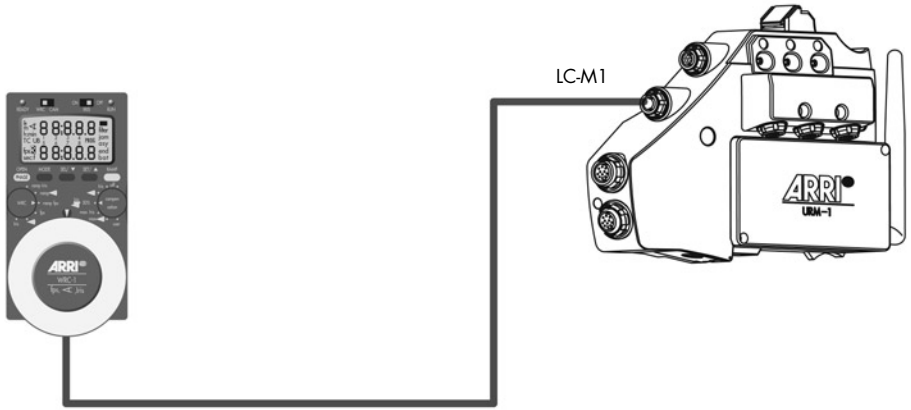
The following pages will show up some exaples for the setup:

WRC-1 via wireless remote control

WRC-1 + WMU-1

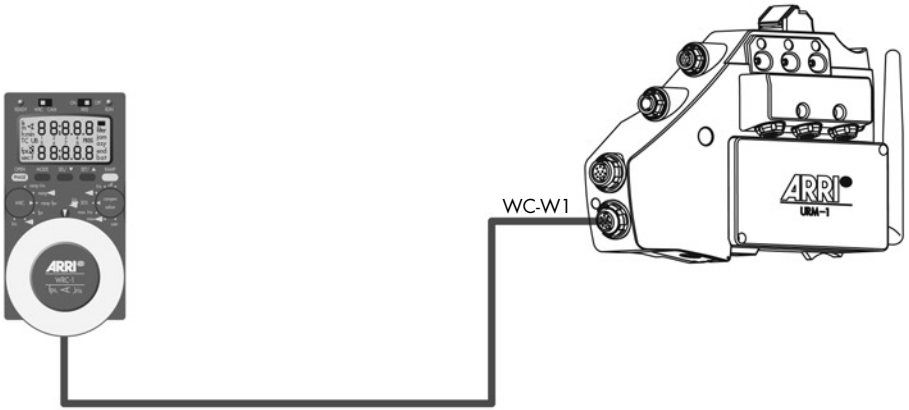


WRC-1 with WHA-2 via cable



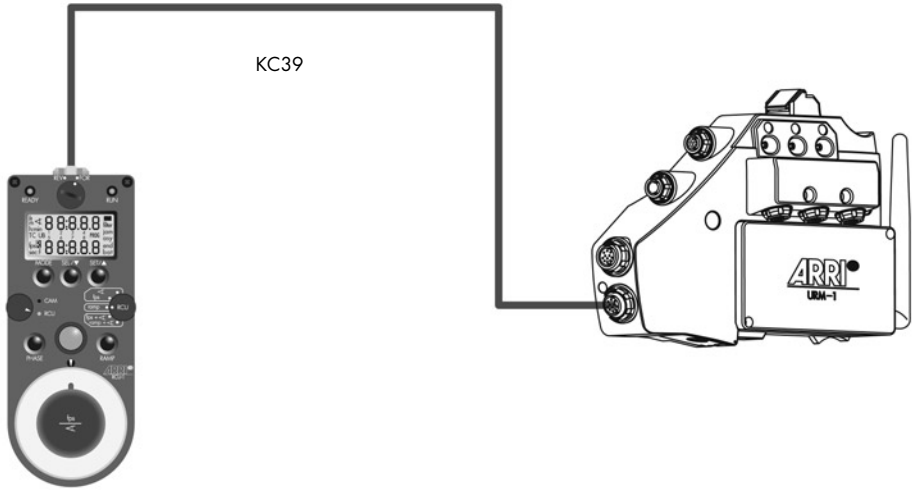
WRC-1 + WHA-2

WRC-1 with WHA-1



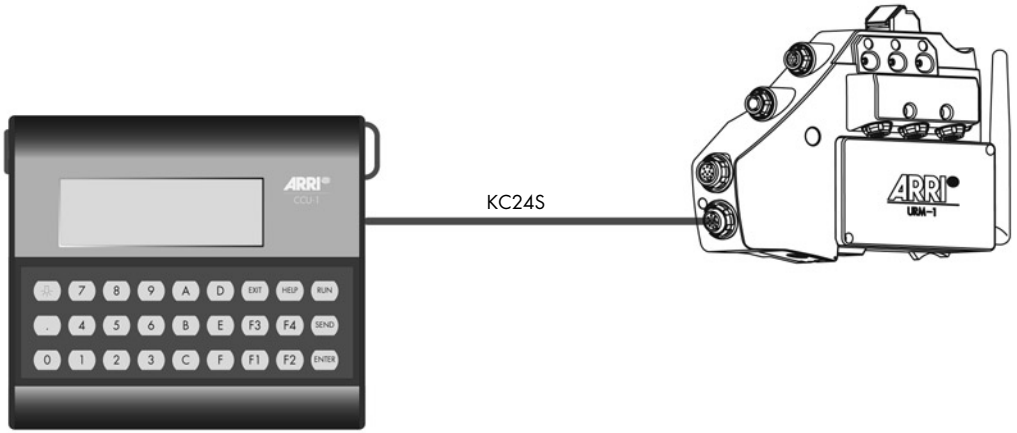
WRC-1 + WHA-2

RCU-1



RCU-1

CCU-1


ARRI
CCU-1
7 8 9 A D EXIT HELP RUN
4 5 6 B E F3 F4 SEND
0 1 2 3 C F F1 F2 ENTER
KC24S
ARRI
URM-1

CCU-1

5.5 Time code

Check if the area for the time code (barcode) exposure at the edge of the film is outside of the image area defined by the used format mask.

If the selected format mask does not cover the time code area, the time code will be exposed into the image area.

Operation

Note: Time code operation is described in the instruction manual for the ARRIFLEX 435 Advanced.

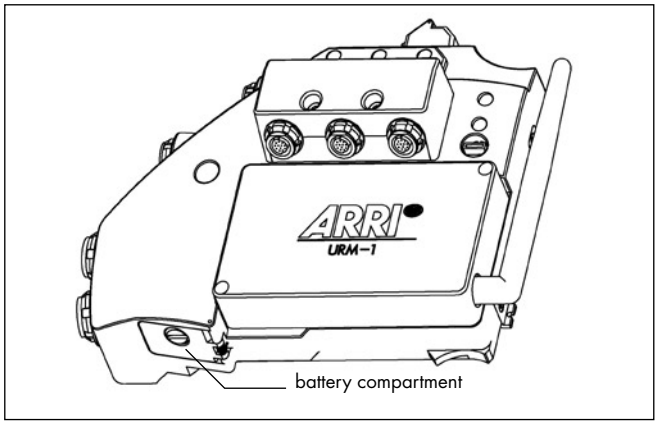
Battery type		
Two batteries	Type	LR6
	USA	AA
	A, D, CH	Mignon

Changing the batteries

The batteries for the time code clock are located under a cover on the bottom of the FEM-2 ⇨ **photo**.

- Use a coin to screw open the battery compartment.

The correct time code must be set after changing the battery.



6. Technical Data

Operating temperature	-20°C to + 50°C
Operating voltage	As for the ARRIFLEX 435 Advanced
Protection type	IP 42
LDD plug	For ARRI LDD or LDD-FP or ARRIMOTION LCB connection
LCS bus	5pol as per ARRI standard Max 2.5 A on both sockets in total Compatible with WHA-2, ZMU-1 and CLM-1
CLM-2 connectors	1 each for zoom, focus and iris CLM-2 and CFM-1 compatible Max 800mA each
TC	SMPTE RP136
TC batteries	2 type AA
TC time code accuracy	3ppm over operating temperature range

7. Additional Documentations

Instruction Manual for ARRIFLEX 435 Advanced K5.58231.0

Instruction Manual for the WRC-1 in German K5.43660.0

Instruction Manual for the WRC-1 in English K5.43668.0

Instruction Manual for the LCS in German K5.52422.0

Instruction Manual for the LCS in English K5.52423.0

technical data are subject to change without notice

© ARRI 2003

available languages:
Deutsch K5.60901.0
English K5.60902.0

ARNOLD & RICHTER CINE TECHNIK Türkenstr. 89 • D-80799 München
Phone +49 – 089 – 3809 – 0 • Fax +49 – 089 – 3809 – 1244
www.arri.com